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EXAMINER
ARMSTRONG, ANGELA A

ART UNIT	PAPER NUMBER
2654	

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23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/181,021	YOSHIOKA ET AL.	
	Examiner	Art Unit	
	Angela A. Armstrong	2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 3, 13, and 19 is withdrawn in view of the newly discovered reference(s) to Peevers (US Patent No. 6,182,042). Rejections based on the newly cited reference(s) follow.

Claim Rejections – 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-13, 15-21, and 23-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sethares (US Patent No. 5,504,270) in view of Serra (US Patent No. 5,536,902), further in view of Peevers (US Patent No. 6,182,042).

Sethares discloses a method and apparatus for dissonance modification to audio signals.

3. Regarding claims 1, 3, 25, 37 and 43, at Figure 4A and 4B and col. 4, lines 49-52; col. 5, lines 24-29 and col. 9, line 35 to col. 10, line 57, Sethares discloses vocal input is passed to an analyzer to produce a spectrum of input partials in the form of frequency and amplitude domain, which reads on "extracting deterministic components from the input voice signal, the deterministic components including a plurality of sinusoidal wave components", since frequency and amplitude are forms of sinusoidal wave components.

Additionally, at Figure 4B, Sethares teaches separating the sinusoidal wave into frequency value coordinates and amplitude value coordinates.

Additionally, at col. 10, lines 16-17, Sethares teaches the system allows a user to provide input timbre information by accessing information stored in the computer database, which reads on "memory means for memorizing reference pitch information."

Additionally, at col. 9, line 35 continuing to col. 10, line 57, Sethares teaches the modification of the frequencies of the partials based on a desired pitch or timbre, which reads on "modulating means for modulating the frequency value coordinates of the sinusoidal wave components."

Additionally, at col. 10, lines 35-43, Figure 4A, element 16, Figure 4B, and Figure 5, Sethares teaches implementation of a synthesizer for mixing the modulated sinusoidal components.

Sethares does not teach extracting only the deterministic components. However, implementation of extracting only deterministic components in a synthesizing system was well known.

In a similar field of endeavor, Serra teaches a method and apparatus for analyzing and synthesizing a sound by extracting and controlling a sound parameter and implements extraction of only deterministic components (col. 10, lines 3-29), for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the embodiment of Sethares to specifically allow extracting only deterministic

components from the input signal, as taught by Serra, for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra, because such a modification would account for more of the residual variations in the data.

Sethares does not specifically teach modulating amplitude value coordinates or a combining means for combining the modulated frequency value coordinates and the modulated amplitude value coordinates to synthesize sinusoidal wave components of the output voice signal having an output pitch and an output timbre different from an input pitch and an input timbre, of the input voice signal, and influenced by a reference pitch and a reference timbre of the reference signal.

Peevers teach a system and method for sound modification employing spectral warping techniques. Specifically, at col. 7, line 56 continuing to col. 8, line 18, Peevers teaches the system can be used as a pitch shifting device which produces an output signal from mixing or combining frequency and amplitude modulated signals through a linear re-mapping of an input signal having a slope proportional to a note number. Peevers teach the re-mapping process has been found to restore the natural quality of the voice data (col. 7, line 62-65).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to implement the frequency and amplitude modulating techniques of Peevers, for the purpose of restoring the natural quality of the voice data, as suggested by Peevers, and thereby improving the overall quality of the audio signal modification system.

Regarding claim 2, Sethares, Peevers, and Serra teach everything as claimed in claim 1. Additionally, at col. 10, lines 6-51, Sethares teaches implementation of an MIDI controller which allows the user to provide input timbre information.

Regarding claims 5 and 7, Sethares, Peevers, and Serra teach everything as claimed in claim 1. At col. 10, lines 35-43, Figure 4A, element 16, Figure 4B, and Figure 5, Sethares teaches implementation of a synthesizer for mixing the modulated sinusoidal components.

Regarding claim 6, Sethares does not specifically teach a control parameter to control the degree of modulation of the amplitude. However, implementation of control parameters for various amplitude parameters was well known.

Serra teaches implementation of user controlled amplitude parameters, such as tilt, for the purpose of allowing the user to freely control the parameter to accurately reflect the user's intentions (col. 11, lines 11-29).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to implement parameter control of amplitude data, for the purpose of allowing the user to freely control the parameter to accurately reflect the user's intention.

Regarding claim 8, Sethares does not specifically teach separating the residual component after the sinusoidal components have been extracted.

Serra teaches (col. 10, lines 3-29) extraction of the frequency and amplitude components as the deterministic component and after the components are extracted, the residual or stochastic component is obtained.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to obtain the residual components after the sinusoidal components are obtained, to ensure the residual components are determined from a current frame to accurately reflect the variation of the input signal.

Regarding claims 30, 33, 36, and 42, at col. 4, line 49, Sethares teaches implementation of Fourier analysis. Sethares does not specifically teach implementation of a peak detecting means to extract the sinusoidal components. However, implementation of peak detection algorithms in a synthesizing system was well known in the art.

Serra (col. 10, lines 3-29) teaches implementation of detecting peaks in the magnitude spectra and is extracted and is used to obtain the time-series frequency and magnitude trajectories.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system to implement detecting peaks in the magnitude spectra, as taught by Serra, for the purpose of ensuring the most accurate and essential frequency/amplitude deterministic pairs are obtained.

4. Regarding claims 9, 13, 15, 26, 39, 45, and 48, at Figure 4A and 4B and col. 4, lines 49-52; col. 5, lines 24-29 and col. 9, line 35 to col. 10, line 57, Sethares discloses vocal input is passed to an analyzer to produce a spectrum of input partials in the form of frequency and amplitude domain, which reads on "extracting deterministic components from the input voice signal, the deterministic components including a plurality of sinusoidal wave components", since frequency and amplitude are forms of sinusoidal wave components.

Additionally, at col. 10, lines 13-27, Sethares teaches the implementation of the MIDI controller which allows user access to timbre profiles stored in a database, and teaches the system allows access to the input and reference partials to modify dissonance, which reads on "memorizing means."

At col. 10, lines 35-43, Figure 4A, element 16, Figure 4B, and Figure 5, Sethares teaches implementation of a synthesizer for mixing the modulated sinusoidal components.

Sethares does not teach extracting only the deterministic components. However, implementation of extracting only deterministic components in a synthesizing system was well known.

In a similar field of endeavor, Serra teaches a method and apparatus for analyzing and synthesizing a sound by extracting and controlling a sound parameter and implements extraction of only deterministic components (col. 10, lines 3-29), for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the embodiment of Sethares to specifically allow extracting only deterministic components from the input signal, as taught by Serra, for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra, because such a modification would account for more of the residual variations in the data.

Sethares does not specifically teach modulating amplitude value coordinates or a normalizing means for normalizing the amplitude value coordinates of the sinusoidal wave

components of the input voice signal and a mixing means for mixing the normalized amplitude value coordinates of the input voice signal and the memorized amplitude value coordinates of the reference voice signal with one another by a predetermined ratio to produce mixed amplitude value coordinates and multiplying means for multiplying the normalized amplitude value coordinates of the sinusoidal wave components of the input voice signal with the mean amplitude of the input voice signal.

Peevers teach a system and method for sound modification employing spectral warping techniques. Specifically, at col. 5, line 14 continuing to col. 6, line 26, Peevers teaches the system bins of the frames of values are normalized and the normalized values and magnitudes are multiplied together. Additionally, at col. 7, line 56 continuing to col. 8, line 18, Peevers teaches the system can be used as a pitch shifting device which produces an output signal from mixing or combining frequency and amplitude modulated signals through a linear re-mapping of an input signal having a slope proportional to a note number. Peevers teach the re-mapping process has been found to restore the natural quality of the voice data (col. 7, line 62-65).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to implement the frequency and amplitude modulating techniques of Peevers, for the purpose of restoring the natural quality of the voice data, as suggested by Peevers, and thereby improving the overall quality of the audio signal modification system.

Regarding claim 10, Sethares, Peevers, and Serra teach everything as claimed in claim 9. Sethares does not specifically teach a control parameter to control the degree of modulation of

the amplitude. However, implementation of control parameters for various amplitude parameters was well known.

Serra teaches implementation of user controlled amplitude parameters, such as tilt, for the purpose of allowing the user to freely control the parameter to accurately reflect the user's intentions (col. 11, lines 11-29).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to implement parameter control of amplitude data, for the purpose of allowing the user to freely control the parameter to accurately reflect the user's intention.

Regarding claim 11, Sethares, Peevers, and Serra teach everything as claimed in claim 9. Additionally, at col. 10, lines 16-17, Sethares teaches the system allows a user to provide input timbre information by accessing information stored in the computer database, which reads on "memory means for memorizing reference pitch information."

Additionally, at col. 9, line 35 continuing to col. 10, line 57, Sethares teaches the modification of the frequencies of the partials based on a desired pitch or timbre, which reads on "modulating means for modulating the frequency value coordinates of the sinusoidal wave components."

Additionally, at col. 10, lines 35-43, Figure 4A, element 16, Figure 4B, and Figure 5, Sethares teaches implementation of a synthesizer for mixing the modulated sinusoidal components

Regarding claim 12, Sethares, Peevers, and Serra teach everything as claimed in claim 11. Additionally, at col. 10, lines 6-51, Sethares teaches implementation of an MIDI controller which allows the user to provide input timbre information.

Regarding claim 16, Sethares does not specifically teach separating the residual component after the sinusoidal components have been extracted.

Serra teaches (col. 10, lines 3-29) extraction of the frequency and amplitude components as the deterministic component and after the components are extracted, the residual or stochastic component is obtained.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to obtain the residual components after the sinusoidal components are obtained, to ensure the residual components are determined from a current frame to accurately reflect the variation of the input signal.

Regarding claims 31, 34, 38 and 44, at col. 4, line 49, Sethares teaches implementation of Fourier analysis. Sethares does not specifically teach implementation of a peak detecting means to extract the sinusoidal components. However, implementation of peak detection algorithms in a synthesizing system was well known in the art.

Serra (col. 10, lines 3-29) teaches implementation of detecting peaks in the magnitude spectra and is extracted and is used to obtain the time-series frequency and magnitude trajectories.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system to implement detecting peaks in the magnitude spectra, as taught by Serra,

for the purpose of ensuring the most accurate and essential frequency/amplitude deterministic pairs are obtained.

5. Regarding claims 17, 19, 23, 27, 28, 29, 41, and 49 at Figure 4A and 4B and col. 4, lines 49-52; col. 5, lines 24-29 and col. 9, line 35 to col. 10, line 57, Sethares discloses vocal input is passed to an analyzer to produce a spectrum of input partials in the form of frequency and amplitude domain, which reads on "extracting deterministic components from the input voice signal, the deterministic components including a plurality of sinusoidal wave components", since frequency and amplitude are forms of sinusoidal wave components.

Additionally, at Figure 4B, Sethares teaches separating the sinusoidal wave into frequency value coordinates and amplitude value coordinates.

Additionally, at col. 10, lines 13-27, Sethares teaches the implementation of the MIDI controller which allows user access to timbre profiles stored in a database, and teaches the system allows access to the input and reference partials to modify dissonance, which reads on "memorizing means."

Additionally, at col. 10, lines 16-17, Sethares teaches the system allows a user to provide input timbre information by accessing information stored in the computer database, which reads on "memory means for memorizing reference pitch information."

Additionally, at col. 9, line 35 continuing to col. 10, line 57, Sethares teaches the modification of the frequencies of the partials based on a desired pitch or timbre, which reads on "modulating means for modulating the frequency value coordinates of the sinusoidal wave components."

At col. 10, lines 35-43, Figure 4A, element 16, Figure 4B, and Figure 5, Sethares teaches implementation of a synthesizer for mixing the modulated sinusoidal components.

Sethares does not teach extracting only the deterministic components. However, implementation of extracting only deterministic components in a synthesizing system was well known.

In a similar field of endeavor, Serra teaches a method and apparatus for analyzing and synthesizing a sound by extracting and controlling a sound parameter and implements extraction of only deterministic components (col. 10, lines 3-29), for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the embodiment of Sethares to specifically allow extracting only deterministic components from the input signal, as taught by Serra, for the purpose of generating a synthetic waveform of the deterministic component and then reanalyze and reextract the deterministic component, which is then subtracted from the magnitude spectra, because such a modification would account for more of the residual variations in the data.

Sethares does not specifically teach modulating amplitude of the sinusoidal wave components. However, modifying the amplitude of sinusoidal wave components in a synthesizing system was well known in the art.

In a similar field of endeavor, Serra teaches a method and apparatus for analyzing and synthesizing a sound by extracting and controlling a sound parameter and implements modifying

the obtained frequency and amplitude parameters to generate a desired synthesized output (Abstract, col. 11, lines 10-67), for the purpose of improving the musical synthesizer.

It would have been obvious to one of ordinary skill at the time of the invention, to modify the system of Sethares to implement amplitude modification, as taught by Serra, for the purpose of expanding the capabilities of the audio modification system.

Sethares does not specifically teach modulating amplitude value coordinates or a combining means for combining the modulated frequency value coordinates and the modulated amplitude value coordinates to synthesize sinusoidal wave components of the output voice signal having an output pitch and an output timbre different from an input pitch and an input timbre, of the input voice signal, and influenced by a reference pitch and a reference timbre of the reference signal.

Peevers teach a system and method for sound modification employing spectral warping techniques. Specifically, at col. 7, line 56 continuing to col. 8, line 18, Peevers teaches the system can be used as a pitch shifting device which produces an output signal from mixing or combining frequency and amplitude modulated signals through a linear re-mapping of an input signal having a slope proportional to a note number. Peevers teach the re-mapping process has been found to restore the natural quality of the voice data (col. 7, line 62-65).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to implement the frequency and amplitude modulating techniques of Peevers, for the purpose of restoring the natural quality of the voice data, as suggested by Peevers, and thereby improving the overall quality of the audio signal modification system.

Regarding claim 18, Sethares, Peevers, and Serra teach everything as claimed in claim 17. Additionally, at col. 10, lines 6-51, Sethares teaches implementation of an MIDI controller which allows the user to provide input timbre information.

Additionally, at col. 9, line 35 continuing to col. 10, line 57, Sethares teaches the modification of the frequencies of the partials based on a desired pitch or timbre, which reads on "modulating means for modulating the frequency value coordinates of the sinusoidal wave components."

Regarding claim 20, Sethares, Peevers, and Serra teach everything as claimed in claim 17. Additionally, at col. 10, lines 6-51, Sethares teaches implementation of an MIDI controller which allows the user to provide input timbre information

Sethares does not specifically teach modulating amplitude of the sinusoidal wave components. However, modifying the amplitude of sinusoidal wave components in a synthesizing system was well known in the art.

In a similar field of endeavor, Serra teaches a method and apparatus for analyzing and synthesizing a sound by extracting and controlling a sound parameter and implements modifying the obtained frequency and amplitude parameters to generate a desired synthesized output (Abstract, col. 11, lines 10-67), for the purpose of improving the musical synthesizer.

It would have been obvious to one of ordinary skill at the time of the invention, to modify the system of Sethares to implement amplitude modification, as taught by Serra, for the purpose of expanding the capabilities of the audio modification system.

Regarding claim 21, Sethares, Peevers, and Serra teach everything as claimed in claim 17. Additionally, at col. 10, lines 6-51, Sethares teaches implementation of an MIDI controller which allows the user to provide input timbre information.

Regarding claim 24, Sethares does not specifically teach separating the residual component after the sinusoidal components have been extracted.

Serra teaches (col. 10, lines 3-29) extraction of the frequency and amplitude components as the deterministic component and after the components are extracted, the residual or stochastic component is obtained.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system of Sethares to obtain the residual components after the sinusoidal components are obtained, to ensure the residual components are determined from a current frame to accurately reflect the variation of the input signal.

Regarding claims 32, 35, 40, and 46, at col. 4, line 49, Sethares teaches implementation of Fourier analysis. Sethares does not specifically teach implementation of a peak detecting means to extract the sinusoidal components. However, implementation of peak detection algorithms in a synthesizing system was well known in the art.

Serra (col. 10, lines 3-29) teaches implementation of detecting peaks in the magnitude spectra and is extracted and is used to obtain the time-series frequency and magnitude trajectories.

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the system to implement detecting peaks in the magnitude spectra, as taught by Serra,

for the purpose of ensuring the most accurate and essential frequency/amplitude deterministic pairs are obtained.

6. Claims 4, 14, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sethares (US Patent No. 5,504,270) in view of Serra (US Patent No. 5,536,902), in view of Peevers (US Patent No. 6,182,042) as applied to claims 1, 9, and 17 above, and further in view of well known prior art.

7. Regarding claims 4, 14, 22 Sethares and Serra teach everything as claimed in claims 1, 9, 17. Sethares teaches detecting a pitch of the input signal based on results of extraction at col. 9, lines 38-52.

Sethares does not specifically disclose a switch means for outputting an original of the input voice signal in situations in which a pitch is not detected from the input signal. However, implementation of a switching mechanism to output an original signal when an input signal cannot be analyzed was well known in the art.

Therefore, it would have been obvious to output an original signal in cases in which a pitch is not detected from the input signal to avoid large fluctuations in the pitch of the signal, for the purpose of providing for smooth transitions as the parameter information is synthesized and reducing the unnaturalness of the synthetic signal.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Slaney (US Patent No. 5,749,073) discloses a system for morphing of two audio signals to generate a new sound having characteristics between those of the original sounds.

Shinbara et al (US Patent No. 5,862,232) discloses a sound pitch converting apparatus for shifting a pitch of a sound signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela A. Armstrong whose telephone number is 703-308-6258. The examiner can normally be reached on Monday-Thursday 7:30-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on (703) 305-4379. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Angela A. Armstrong
Examiner
Art Unit 2654

AAA
June 28, 2003

Marsha D Banks-Harold
MARSHA D. BANKS-HAROLD
SUPERVISORY PATENT EXAMINER
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